

Case 10106(2)

EPO 2001

22 09. 2005

114

Claims:

1. A method for connecting a first tubular element and a second tubular element comprising:

locating a portion of the first tubular element within a portion of the second tubular element,

5 expanding the portion of the first tubular element and/or compressing the portion of the second tubular element to form a connection resulting from the interference between the external surface of the portion of the first tubular element and the internal surface of the portion of the second tubular element,

10 in which, prior to assembly, one or both of the external surface of the portion of the first tubular element and the internal surface of the portion of the second tubular element is/are at least partially coated with hard angular material, characterised in that the hard angular material is applied to the external surface of the portion of the first tubular element and/or the internal surface of the portion of the second tubular element by plasma spraying to form protuberances on the surface.

15 2. A method as claimed in claim 1 in which a mask is used to form the protuberances.

3. A method as claimed in claim 2 in which a foraminous mask is placed over at least part of the external surface of the portion of the first tubular element and/or part of the internal surface of the portion of the second tubular element before the surface is  
20 sprayed such that the plasma spray passes through holes in the mask, forming protuberances on the surface of the surface when the mask is removed.

4 A method as claimed in any one of claims 1 to 3 in which part of the portion of

the first tubular element and a corresponding part of the portion of the second tubular element are not coated by plasma spraying such that when the connection is expanded these bare metal parts form a metal-to-metal seal.

5. A method as claimed in any one of claims 1 to 4 in which two pipes are

5 connected by locating one end of each of the pipes over a pin of a male/male connector and within the box of a female/female connector and expanding the internal diameter of the male/male connector.

6. A method as claimed in any one of claims 1 to 5 in which at least one element designed to be embedded in the surfaces as the connection is expanded is located  
10 between the external surface of the portion of the first tubular element and/or part of the internal surface of the portion of the second tubular element

7. A method for connecting piping used in oil and gas boreholes comprises connecting pipes together as claimed in any one of claims 1 to 6, lowering the pipe string into the borehole and subsequently radially expanding the pipe string downhole.

15 8. An expandable tubular element suitable for forming connections by a method as claimed in any one of claims 1 to 7 having protuberances on a part of its surface adjacent at least one end thereof which have been formed by plasma spraying a hard angular material.

9. An expandable tubular element as claimed in claim 8 which is a male/male  
20 coupling comprising two pin connectors the plasma sprayed protuberances being on the external surfaces of the pin connectors.

10. An expandable tubular element as claimed in claim 8 which is a female/female coupling comprising two box connectors the plasma sprayed protuberances being on the internal surfaces of the box connectors.

25

30